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(54) Means for the mooring of boats  
which are afloat

(57) A plurality of floating pontoons (1, 1', 1'') are grouped to form a closed loop and are anchored to the bottom of the sea or lake. Each pontoon (1) is associated with a catwalk (2) alongside which at least one boat (A) can be moored, and the pontoons (1) and the catwalks (2) carry fixing elements (3) to permit mooring of the boat (A) or boats.

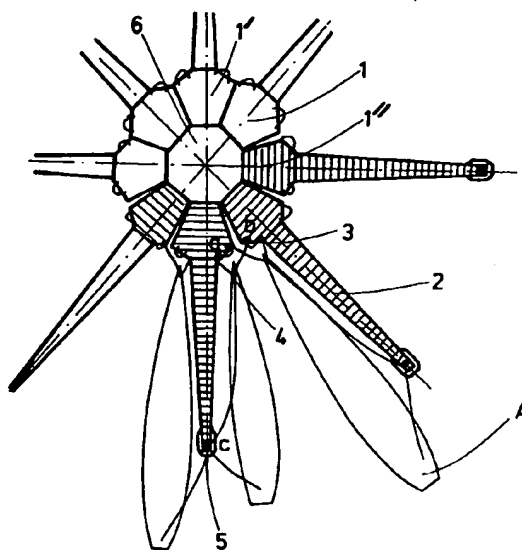


Fig.1

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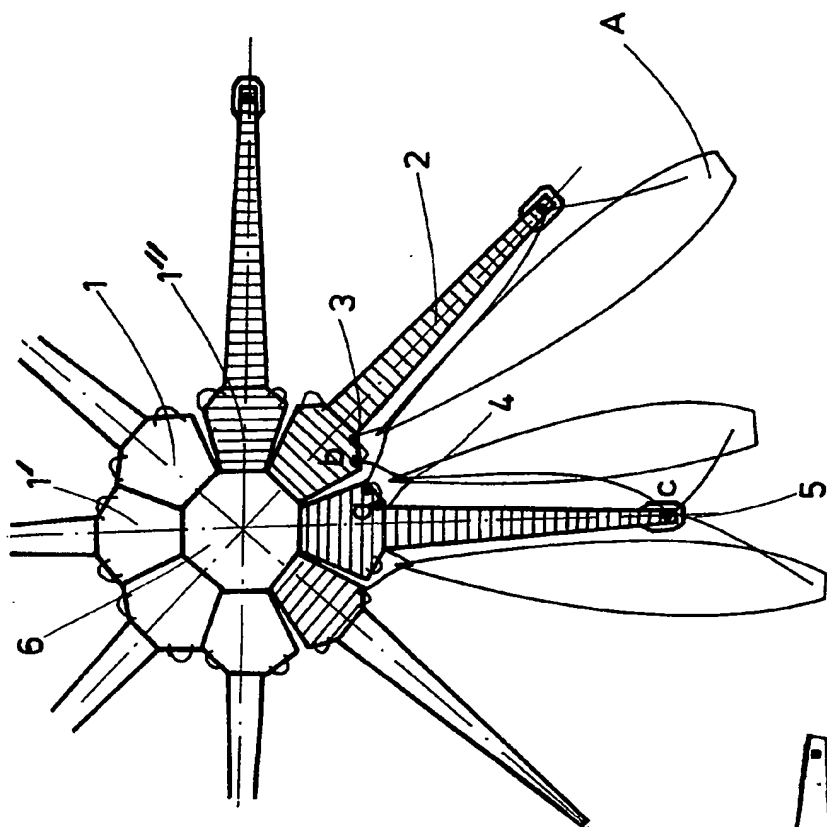


Fig.1

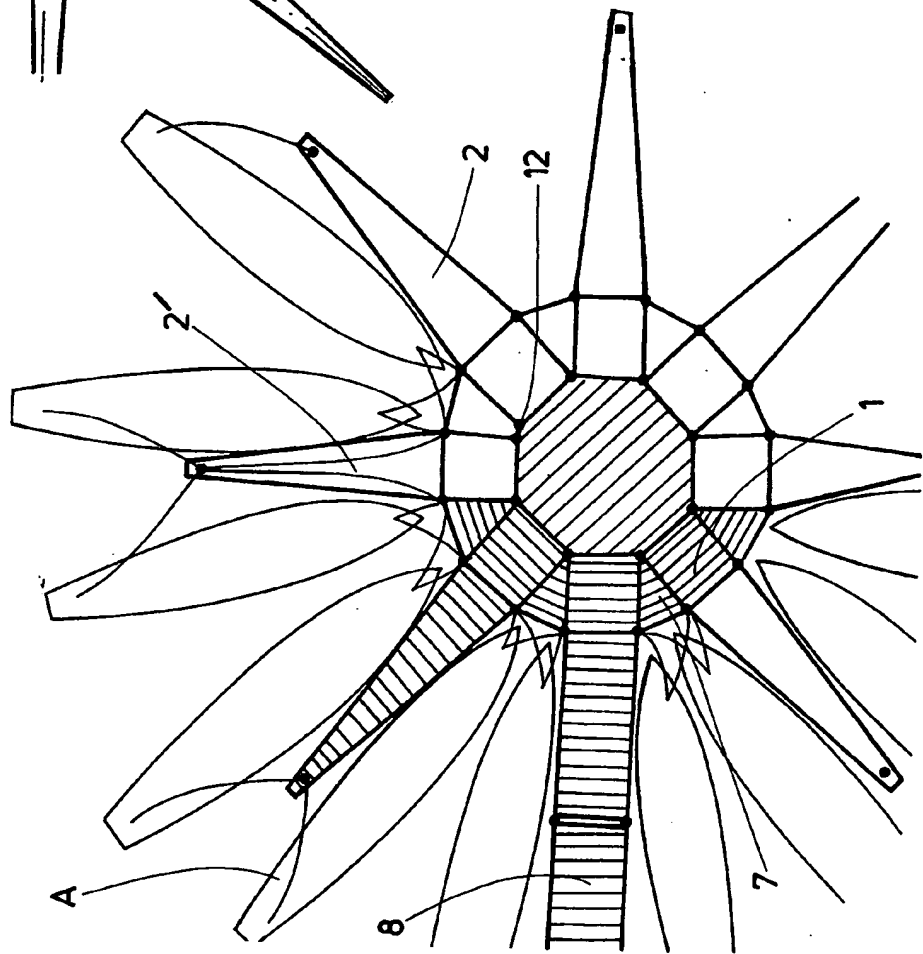


Fig.2

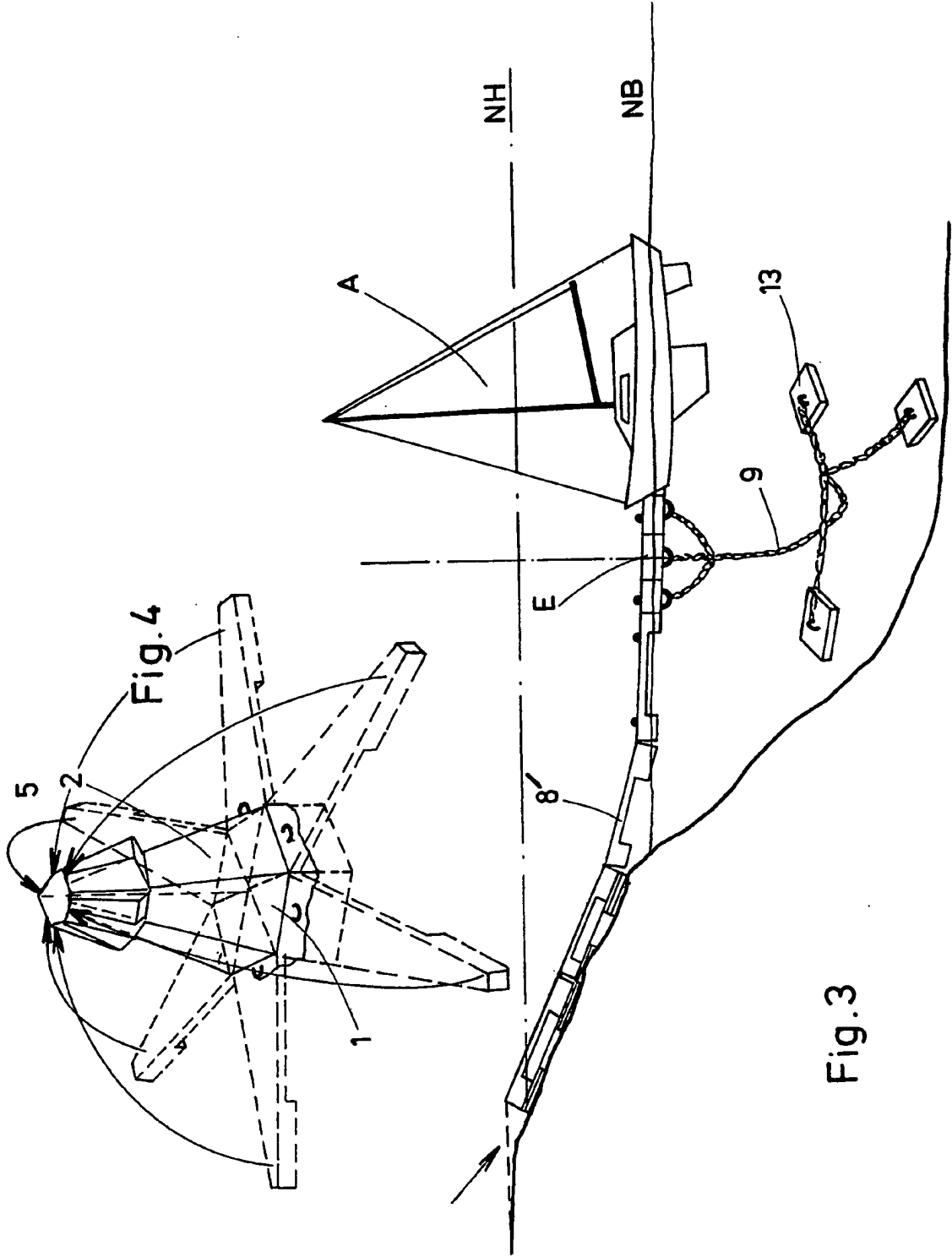


Fig.6

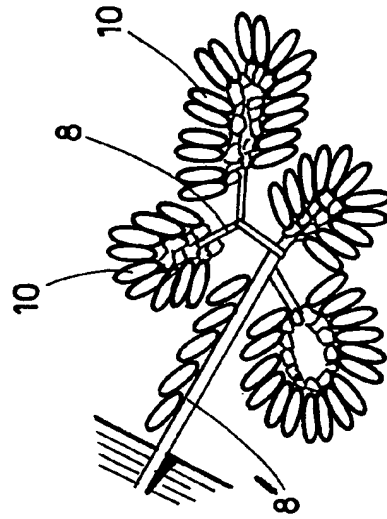


Fig.5

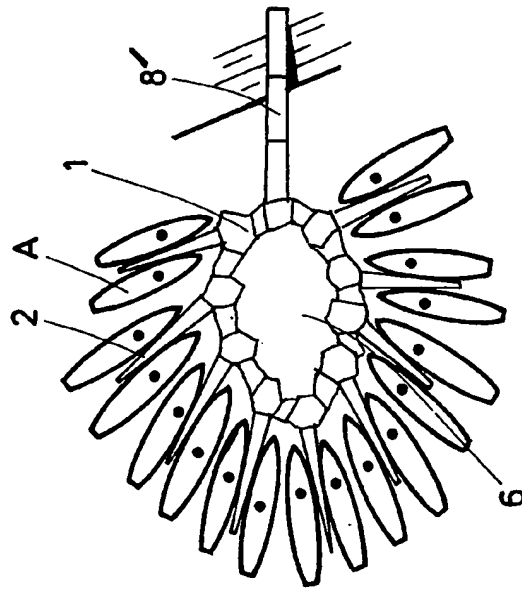
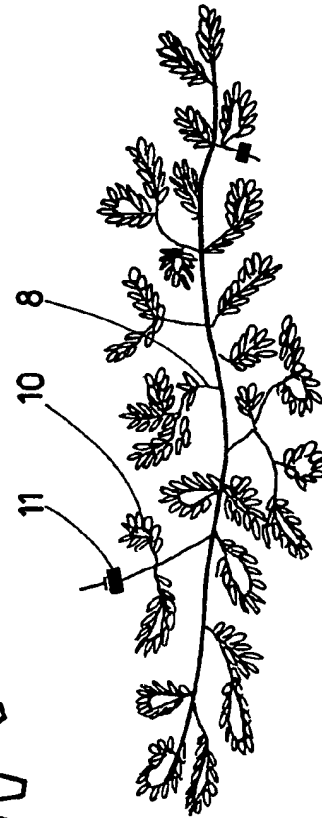


Fig.7



## SPECIFICATION

### Means for the mooring of boats which are afloat

5 The invention relates to means for mooring boats while they are afloat, that is to say an arrangement which may be applied to mooring at sea, on a lake or in a river.

Until recent years, the acquisition of pleasure boats was limited to a select few and yachtsmen were content with open berths, which means that they moored their boats to individual mooring buoys anchored in relatively sheltered situations. The solution was satisfactory, both from the point of view of aesthetics and from the point of view of the cost of mooring boats and the drawback which arose out of the fact that ancillary boats, *i.e.* tenders, were necessary to provide access to or in order to depart from moored boats was largely off-set by these advantages.

With the ever-increasing popularity of pleasure sailing and consequently the growth in the number of boats in service, this "uncontrolled mooring" solution is no longer suitable in view of the fact that a given location is able to moor only an insufficient density of boats, of the order of six berths per hectare. An increase of this density is impossible in view of the fact that it is limited by the need to allow swinging of the boats, that is to say a clear radius around each boat necessary to avoid entanglement due to the changing directions of winds and tides.

Furthermore, an increase in this density would culminate in a dockside proliferation of tenders which would not fail to present considerable problems.

Consequently, it became necessary to look for different solutions.

For this reason, there was a move towards creating artificial ports or "marinas" which offer the advantage of making it possible to moor a large density of boats (of the order of 100 units per hectare) and of being readily accessible. Nevertheless, they do have a number of drawbacks resulting from their high cost of installation and administration.

These difficulties may be off-set by the price asked for the rental of berths but the shortage of locations is more and more impeding the setting up of new marinas and the establishment of such marinas is no longer accepted everywhere because they tend to render locations ugly due to the number of jetties, mooring places and ancillary constructions which are required.

Faced with the difficulty of increasing the number of marinas, it was therefore necessary to seek a new formula.

According to the invention there is provided means for mooring boats which are afloat, said means being either connected to land or not so connected and comprising pontoons articulated to one another to constitute assemblies of any suitable geometrical form with each assembly of pontoons forming a closed loop from which extend catwalks each associated with a respective pontoon to delineate berths and alongside each of which catwalks at

least one boat can be moored, each assembly of pontoons being anchored to the sea or lake bottom and the pontoons and catwalks carrying fixing elements whereby the boats can be moored thereto.

70 Thus the invention can provide means midway between open berths and conventional marinas and can maximise the advantages of both solutions while minimising their disadvantages.

Preferably, the assemblies of pontoons formed closed loops around which the catwalks delineate the locations provided for the boats.

According to the structure and the size of the boats to be moored, so the pontoons can either be directly attached to one another or can be joined by means of junction elements, the form of which is likewise chosen according to the structure.

These junctions which may be direct or via ancillary elements can be provided without articulation in the case of small assemblies (comprising 6 or 8 berths) or can be articulated in the case of larger assemblies in order to absorb the effects of swells and waves; shock absorbers may be set in position if necessary in order to retain the flexibility of the whole while eliminating excessive softness.

Generally speaking, in cases where the catwalks are disposed radially on pontoons, it is possible to assemble the pontoons in unitary groupings of radiating form similar to a "daisy", composed of any number (6, 8, 10, 12, etc...) of geometrical pontoons each of which has a catwalk.

According to the form of the catwalks and of the connecting elements so the groups may assume a more or less irregular shape.

These various unitary groups can be connected one to another by connecting pontoons, each connecting pontoon replacing a catwalk.

Thus, from unitary groupings it is possible, according to the free space available at the chosen location, to obtain a tree-like structure.

105 The means of the invention entails no precise physical limit unless it is one corresponding to the optimum number of berths to be created and to the geometry of the location.

Advantageously, the catwalks can be raised and easily moved.

This feature is particularly important since it can reduce the cost of transporting the elements and moreover it makes it possible effectively to clean the port.

115 Furthermore, this particular feature facilitates temporary extension or diminution of berthing locations according to the season.

Preferably the pontoons are provided with water and/or electricity distributing means.

120 The upper surfaces of the pontoons, catwalks and connecting pontoons can be constituted by non-joined boards constituting a non-slip surface on which to walk.

The floating assemblies can be anchored to the sea or lake bottom and may comprise peninsulars, that is to say assemblies which are connected to land by access pontoons which can be aground at low tide, or by islands connected to land by more or less frequent shuttles, according to the size of the island.

130 The result therefore can be a structure which is

entirely satisfactory from the point of view of utilisation and which can have at the same time, certain qualities from the aesthetic point of view.

The invention is diagrammatically illustrated by way of example in the accompanying drawings, in which:-

*Figures 1 and 2* represent two diagrammatic views of means for mooring boats according to the invention;

*Figure 3* shows the siting of such a means;

*Figure 4* shows such a means in a "folded-up" condition;

*Figures 5 and 6* represent two examples of a structure of means according to the invention, forming peninsulars; and

*Figure 7* shows an example of an "island" structure of means according to the invention.

Referring to the drawings and firstly to *Figure 1*, means for mooring boats *A* comprises a plurality of pontoons *1* grouped in assemblies of any suitable geometrical form. Each pontoon *1* is associated with a catwalk *2* provided with a float *5* disposed radially outwardly of the pontoon *1* and alongside which catwalk *2* a boat *A* can berth and be moored to fixing elements *3* provided especially for the purpose on the pontoons *1* and on the catwalks *2*.

According to the situation illustrated in *Figure 1*, the pontoons *1* and *1'* are rigid with one another while the pontoon *1* is articulated on the pontoon *1''*. This type of connection by articulation is interesting in the case of large-sized assemblies because it makes it possible to absorb the swell and the waves.

As illustrated in *Figure 1*, in conventional manner, the bow *4* of each boat is moored at two forward points *a* and *b* provided on the pontoons *1* while check springs ahead and astern are fixed to a radially outward point *c* provided on the catwalk *2*.

The number of pontoons *1* and the dimensions of each of the pontoons *1* in each unitary group are chosen as a function of the desired overall structure. *Figure 1* illustrated the case of an assembly which forms the shape of a "daisy" with eight arms; of course, this structure which makes it possible to moor 16 boats, is not in any way intended to limit the scope of the invention.

As shown in *Figure 2*, the pontoons *1* are connected by junction elements *7* which make it possible to increase the clear space between the two catwalks *2* and *2'* of adjacent pontoons and therefore the size of the boats which these assemblies are capable of receiving. The connecting elements *7* may be either rigidly fixed to the pontoons *1* or articulated on the pontoons *1* by means of an articulating member such as is illustrated for example diagrammatically at *12*.

Each assembly of pontoons *1* and catwalks *2* constitutes a unit which can be connected to land or to another assembly of similar kind by a series of connecting pontoons *8*. In each group, the connecting pontoon *8* replaces a catwalk *2* and, in the same way as the pontoons *1*, the catwalks *2* and the connecting elements *7*, has a top made from non-slip non-connected boards and comprising adequate arrangements for protecting the hulls of the boats from impact with sharp corners and edges.

Referring to *Figure 3*, assemblies *E* of pontoons *1* are anchored to the sea or lake bed by means of a chain device *9* secured to anchors *13*.

Moreover, the assemblies can be connected to land by connecting pontoons *8'* which float at high tide (level *NH*) and which can ground at low tide (level *NB*), so constituting a negotiable passage to dry land.

Referring to *Figure 4*, the catwalks *2* can be folded upwardly over the pontoons *1* which renders the elements easily tractable when the port is being serviced or in the event of a temporary extension or diminution according to season and thus demand.

Consequently, the pontoons, catwalks and connecting elements can be standard units and therefore relatively inexpensive floating elements and furthermore can include apertures and other temporary fixing means for either articulated or rigid connection of the pontoons to one another and to the connecting elements and catwalks.

In addition to their own floats, the catwalks *2* can include rings and systems for mooring and raising boats.

The pontoons *1* furthermore can include means such as mooring, anchoring and the necessary warping rings, together with the supporting distributing elements (for water, electricity).

Referring to *Figures 5 to 7*, on a basis of the elements described hereinbefore, it is possible to provide structures of various kinds according to the location in which assemblies *10* are connected to one another by connecting pontoons *8* in such a way as to provide an overall structure of the branched kind.

One of the advantages peculiar to such a structure is that it can be readily modified and is therefore "deformable" according to the number of boats to be berthed and therefore obviously according to the period of the year.

*Figures 5 and 6* illustrate the cases of one or a plurality of assemblies *10* grouped in the manner of peninsulars, that is to say connected to dry land by means of connecting pontoons *8'* which are capable of grounding at low tide.

*Figure 5* illustrates the case of an "isolated" assembly which is directly connected to dry land by a connecting pontoon *8'*. In this example, the pontoons *1* are fixed directly to one another in such a way as to form a closed loop leaving in its centre *6* a clear part which is capable of being used in various ways; among the possible uses of the clear part *6* is as a children's swimming pool.

In *Figure 6*, the various assemblies *10* of pontoons *1* are on the one hand connected to one another by connecting pontoons *8* (always afloat) and furthermore they are connected to land by a main connecting pontoon *8'* which grounds at low tide.

*Figure 7* illustrates the situation of an island structure, that is to say one which is not directly connected to dry land. In this case, one or a plurality of landing stages may be provided which are connected to land by shuttles provided especially for the purpose.

This island structure has many advantages, particularly in the case of structures made up of assem-

lies constituted by simple daisy shapes which require only a single anchorage at the bottom and which are therefore mobile according to currents or winds, so reducing the risks of entanglement during the see-sawing action of tides.

Thus, the invention can provide a means of mooring which can have an aesthetically attractive appearance and which can be of a shape in keeping with that of sailing boats.

The variable form of this kind of mooring means makes it possible to adapt it to specific locations and therefore far more locations without in any way damaging the location.

Furthermore, the security of this anchoring means can be excellent; since, having regard to its grouped form, it can fully absorb deformations in the water level such as waves or swells.

#### CLAIMS

1. Means for mooring boats which are afloat, said means being either connected to land or not so connected and comprising pontoons articulated to one another to constitute assemblies of any suitable geometrical form with each assembly of pontoons forming a closed loop from which extend catwalks each associated with a respective pontoon to delineate berths and alongside each of which catwalks at least one boat can be moored, each assembly of pontoons being anchored to the sea or lake bottom and the pontoons and the catwalks carrying fixing elements whereby the boat or boats can be moored

thereto.

2. Means according to claim 1, in which the pontoons are floating.

3. Means according to claim 1 or claim 2, in which the pontoons are connected by means of connecting elements, the form of which is chosen according to the structure desired.

4. Means according to any one of claims 1 to 3, in which the catwalks are disposed radially of the pontoons or assemblies of pontoons.

5. Means according to any one of claim 1 to 4, in which the catwalks are capable of being raised by pivoting movement with respect to the pontoons.

6. Means according to any one of claims 1 to 5, in which the assemblies of pontoons are connected to one another by connecting pontoons, each connecting pontoon replacing a catwalk.

7. Means according to any one of claims 1 to 6, in which the pontoons are provided with water and/or electricity distributing elements.

8. Means according to any one of claims 1 to 7, in which the upper surfaces of the pontoons, catwalks and connecting pontoons are constituted by non-connected boards.

9. Means according to any one of claims 1 to 8, in which the assemblies of pontoons constitute islands or peninsulars.

10. Means for mooring boats which are afloat substantially as hereinbefore described and illustrated with reference to any of the accompanying drawings.